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(54) Title: FUNGICIDES BASED ON NITROGEN-CONTAINING HETEROCYCLES

(57) Abstract: Fungicidal compounds having the general formula (1): formula (1) wherein W, Z and one of X and Y are N and the other one of X and Y is CR8, R8 is H, halo, C1.4 alkyl, C1.4 alkoxy, C1.4 alkylthio or halo(C1.4) alkyl; R and R2 are independently H, halo, C<sub>1.8</sub> alkyl, C<sub>1.8</sub> alkoxy, C<sub>1.8</sub> alkylthio, C<sub>2.8</sub> alkenyl, C<sub>2.8</sub> alkynyl, cyano or NR<sup>3</sup>R<sup>4</sup>, provided that at least one of R and R<sup>2</sup> is NR<sup>3</sup>R<sup>4</sup>; R<sup>1</sup> is halo,  $C_{1.8}$  alkyl,  $C_{2.8}$  alkenyl,  $C_{2.8}$  alkenyl,  $C_{3.8}$  cycloalkyl,  $C_{3.8}$  cycloalkyl,  $C_{1.6}$ )-alkyl,  $C_{1.8}$  alkoxy,  $C_{1.8}$  alkylthio, aryl, aryloxy, arylthio, heteroaryl, heteroarylthio, aryl $(C_{1-4})$ alkyl, aryl $(C_{1-4})$ alkoxy, heteroaryl $(C_{1-4})$ alkyl, heteroaryl $(C_{1-4})$ alkoxy, heteroaryl $(C_{1-4})$ alkyl, heteroaryl $(C_{1-4})$ alkoxy, heteroaryl $(C_{1-4})$ alkyl, heteroaryl $(C_{1-4})$ alk  $aryl(C_{1-4})alkylthio$ , heteroaryl $(C_{1-4})alkylthio$ , morpholino, piperidino or pyrrolidino;  $R^3$  and  $R^4$  are independently H,  $C_{1-8}$  alkyl,  $C_{2-8}$ alkenyl, C<sub>2-8</sub> alkynyl, aryl, aryl(C<sub>1-8</sub>)- alkyl, C<sub>3-8</sub> cycloalkyl, C<sub>3-8</sub> cycloalkyl(C<sub>1-6</sub>)alkyl, heteroaryl, heteroaryl(C<sub>1-8</sub>)alkyl, NR<sup>5</sup>R<sup>6</sup>, provided that not both  $R^3$  and  $R^4$  are H or  $NR^5R^6$ , or  $R^3$  and  $R^4$  together form a  $C_{3-7}$  alkylene or  $C_{3-7}$  alkenylene chain optionally substituted with one or more C<sub>1-4</sub> alkyl or C<sub>1-4</sub> alkoxy groups, or, together with the nitrogen atom to which they are attached, R<sup>3</sup> and R<sup>4</sup> form a mor $pholine, thiomorpholine S-oxide \ or \ thiomorpholine S-dioxide \ ring \ or \ a \ piperazine \ \textit{N-}(C_{1-4}) alkyl \ (especial or \ piperazine \ \textit{N-}(C_{1-4})) alkyl \ (especial \ ring) \ (especial \ ri$ cially N-methyl) ring; and R<sup>5</sup> and R<sup>6</sup> are independently H, C<sub>1-8</sub> alkyl, C<sub>2-8</sub> alkenyl, C<sub>2-8</sub> alkynyl, aryl, aryl, (C<sub>1-8</sub>)alkyl, C<sub>3-8</sub> cycloalkyl, C<sub>3.8</sub> cycloalkyl(C<sub>1.6</sub>)alkyl, heteroaryl or heteroaryl(C<sub>1.8</sub>)alkyl; any of the foregoing alkyl, alkenyl, alkynyl or cycloalkyl groups or moieties (other than for R<sup>8</sup>) being optionally substituted with halogen, cyano, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkoxy, C<sub>1-6</sub> alkoxycarbonyl, C<sub>1-6</sub> haloalkoxy, C<sub>1-6</sub> alkylthio, tri(C<sub>1-4</sub>)alkylsilyl, C<sub>1-6</sub> alkylamino or C<sub>1-6</sub> dialkylamino, any of the foregoing morpholine, thiomorpholine, piperidine, piperazine and pyrrolidine rings being optionally substituted with C14 alkyl (especially methyl), and any of the foregoing aryl or heteroaryl groups or moieties being optionally substituted with one or more substituents selected from halo, hydroxy, mercapto,  $C_{1-6}$ alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_{1-6}$  alkoxy,  $C_{2-6}$  alkenyloxy,  $C_{2-6}$  alkynyloxy, halo( $C_{1-6}$ )alkyl, halo( $C_{1-6}$ )alkoxy,  $C_{1\text{-}6} \ alkylthio, \ halo(C_{1\text{-}6})alkylthio, \ hydroxy(C_{1\text{-}6})alkyl, \ C_{1\text{-}4} \ alkoxy(C_{1\text{-}6})alkyl, \ C_{3\text{-}6} \ cycloalkyl, \ C_{3\text{-}6} cycloalkyl(C_{1\text{-}4})alkyl, \ phenoxy, \ phen$ benzyloxy, benzoyloxy, cyano, isocyano, thiocyanato, isothiocyanato, nitro, -NR"'R"", NHCOR"', -NHCOR"', -CONR"'R"", -CONR"'R"", -SO<sub>2</sub>R"', -OSO<sub>2</sub>R"', -COR"', -CR"'=NR"" or -N=CR "'R"", in which R"' and R"" are independently hydrogen, C<sub>1-4</sub> alkyl, halo-(C14)alkyl, C14 alkoxy, halo(C14)alkoxy, C14 alkylthio, C36 cycloalkyl, C36 cycloalkyl(C14)alkyl, phenyl or benzyl, the phenyl and benzyl groups being optionally substituted with halogen, C<sub>1-4</sub> alkyl or C<sub>1-4</sub> alkoxy.



